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SUBSTITUTE CLAIMS

Claim 13. An improved jar tool for delivering tools, including electronic packages, into wellbores and for retreiving tools stuck in the wellbore, comprising:

said jar tool includes upper and lower spaced housings having confronting spaced ends coupled together by a lost motion coupling for limited movement of the housings toward and away from one another along a common axis, and opposed ends opposed to one another and to the lost motion coupling; a closure member forming attachment means at each opposed end of the upper and the lower housings, respectively, for supporting and running the jar tool into and out of a wellbore and for attaching tools thereto ; and confronting closure members at the confronting ends of the housings;

a shaft having opposed ends reciprocatingly received respective the upper housing; said upper housing having axially aligned annular stored energy chambers formed respective said shaft and said housing; biasing means supported within each annular stored energy chambers, including springs having different spring characteristics;

transfer members extending from said shaft for engaging and compressing said biasing means to thereby store energy therewithin responsive to relative movement of said shaft respective said upper housing;

a releasable latch means interconnecting the shaft and lost motion couping and for releasing the shaft respective the lost motion coupling upon demand after storing energy within the biasing means, thereby enabling acceleration of the upper housing away from

the lower housing; a hammer and anvil, respectivly, positioned within the upper housing on a confronting closure member and on the lost motion coupling, respectivly;

an axial passageway formed through said upper housing, and continues on through the lost motion coupling into the lower housing, a protective tubing having ends with one end affixed respective the upper housing and the other end terminating within a chamber formed in the lower housing; said tubing is slidably received within the passageway, an electrical conductor extending through the tubing and having an end adapted to be connected to a conductor extending uphole from the upper housing, and another end being received within the chamber formed within the lower housing where the conductor is provided with a surplus length to provide for the length of the stroke occasioned by reciprocation of the upper housing respective the lower housing, the last said end of the conductor terminating in a connector adapted to be connected to apparatus supported respective said lower housing.

Claim 14. The jar tool of Claim 13 wherein a wireline supports a sinker bar which is supportingly attached to the upper housing for running the jar tool into and out of the wellbore, and for moving the latch member from a latched into an unlatched position; and vice versa,

said protective tubing extends through the shaft, through the releasable coupling, hammer, and lost motion coupling, where the lower terminal end of the tubing opens into the chamber formed in the lower housing where the conductor is provided with sufficient length to provide for the take up required by the length of the stroke occasioned by reciprocation of the main upper housing respective the lower main housing, the other end of the conductor is

adapted to be connected to apparatus supported respective said lower chamber to thereby enable electronic data to be transmitted from the lower end of the jar tool axially through the jar tool, and along the wireline to the surface.

Claim 15. An improved jar tool for use in wellbores and for retrieving stuck objects from a wellbore, comprising:

upper and lower housings having confronting ends coupled together by a lost motion coupling for limited movement toward and away from one another along a common axis; and opposed ends opposed to one another and to said lost motion coupling; attachment means connected at each opposed end of the upper and the lower housings for supporting and running the tool into and out of the wellbore and for attaching an apparatus including a tool to the lower end of the lower housing;

a shaft having opposed ends reciprocatingly received within said upper housing; said upper housing having a plurality of annular stored energy chambers formed therein between said shaft and said upper housing; biasing means, including springs having different spring characteristics, are supported within the stored energy chambers and arranged concentrically respective said shaft;

said shaft having an outwardly extending member thereon connected to engage said biasing means for storing energy therein in response to relative movement of said upper housing respective said lower housing;

releasable latch means interconnecting one end of the shaft respective one end of the lost motion coupling for releasing energy stored within said biasing means upon demand; a hammer having opposed ends and forming a closure for said lower end of said upper chamber; an anvil affixed to and underlying the releas-

able latch means and confronting said hammer; said lost motion coupling interconnecting the upper and lower housings to be moved along a common axis toward and away from one another, and extends from the releasable latch means;

one end of the lost motion coupling terminates within said upper chamber while the other end is affixed to said lower housing; the anvil is positioned to transmit a jaring action through the lost motion coupling into the lower housing when said hammer impacts thereagainst;

said lower housing has a chamber formed therein; a piston slidably received within the chamber dividing the chamber into first and second chambers, said protective tubing extends through said first chamber, said piston; and into said second chamber where the conductor emerges from the tubing and is provided with a greater length than the length of the stroke of the lost motion coupling.

Claim 16. The improvement of Claim 15 wherein the jar tool is run into a borehole supported by a wireline, said releasable latch means interconnects the shaft respective the lost motion coupling apparatus for releasing the lower end of the shaft from the lost motion coupling upon increase in the wireline tension;

a hammer formed on an inner face of the confronting closure member and an anvil connected to the shaft for abuting engagement of the hammer when said latch means is unlatched.

Claim 17. An improved jar tool for use in wellbores and for retrieving stuck objects from a wellbore, comprising:

said jar tool having axially aligned upper and lower housings having confronting ends and opposed ends; said housings being coupled together by a lost motion coupling arranged therebetween for limited movement of the housings toward and away from one another along a common axis;

a shaft having opposed ends and reciprocatingly received within said upper housing, and a plurality of annular stored energy chambers formed therein between said shaft and said housing; biasing means, including springs having different spring characteristics, are supported within said annular stored energy chambers and arranged concentrically respective said shaft;

a closure means connected at each opposed end of the upper and the lower housings for supporting and running the tool into and out of the wellbore and for attaching an apparatus including a tool to the lower end of said lower housing; said lost motion coupling having one end attached to the confronting closure means of the lower housing, with the opposed end slidably extending through the confronting closure means of the upper housing where the lost motion coupling is attached to the shaft by a releasable latch means ;

said shaft having an outwardly extending member thereon connected to engage said biasing means for storing energy therein in response to relative movement of said upper housing respective said lower housing;

a hammer formed on an interior face of the confronting closure means of the upper housing; an anvil affixed to and underlying the releasable latch means and confronting the hammer;

whereby; when the jar tool is in the latched configuration and subjected to an increased uphole force, the releasable latch means separates, releasing the shaft of the upper housing, whereupon the upper housing accelerates axially away from said lower housing and is arrested by said hammer abuttingly engaging said anvil, thereby providing a jar action for a tool string.

Claim 18. The jar tool of Claim 17 wherein there is an axial passageway formed through said shaft, through said latch means, anvil, lost motion coupling and into a chamber formed in said lower chamber;

an electrical conductor within the passageway having opposed ends, one end adapted to be connected to a conductor extending uphole to the surface, the other end extending through the axial passageway into a chamber formed in the lower chamber where a conductor length is stored which is a greater length than the length of the stroke of the lost motion coupling.

Claim 19. The jar tool of Claim 17 wherein there is an axial passageway formed through said upper housing, including extending through the shaft, releasable latch means, anvil, hammer, lost motion coupling, and opens into a chamber formed within the lower housing; a protective tubing attached respective the upper housing and slidably received within the passageway;

an electrical conductor supported within the protective tubing and having opposed ends, one conductor end adapted to be connected to a conductor extending uphole toward the surface, the other end extending into a chamber formed within the lower housing, said housing being divided into chambers by a movable wall through which the end of the tubing extends, and where the conductor is

stored in a loose or serpentine configuration where the terminal end can be connected to an apparatus supported by the lower housing.

Claim 20. Method for electronically communicating between an uphole apparatus and a downhole jar tool apparatus that forms part of a tool string located downhole within a wellbore, and, wherein the jar tool is useful for retrieving stuck objects from a wellbore;

said jar tool includes opposed upper and lower housings having confronting ends coupled together by a lost motion coupling having one end affixed to the lower housing and the other end extending into the upper housing where it is connected to a releasable latch apparatus interposed between the shaft and the lost motion coupling for limited movement of the housings toward and away from one another along a common axis; and, opposed ends opposed to one another and to said lost motion coupling, with there being attachment means at each opposed end of the upper and the lower main housings for supporting and running the tool into and out of a borehole and for attaching an apparatus, including a tool, to the lower end thereof;

there being axially aligned annular stored energy chambers formed within said upper main housing; and, biasing means,including springs, within each stored energy annular chamber arranged concentrically respective the shaft which is connected to the shaft in a manner to store energy within said biasing means responsive to relative movement between said upper and lower housings; comprising the steps of:

step 1. configuring the shaft to engage the biasing

means to compress the biasing means and thereby store energy therein responsive to downward movement of said said upper housing respective the lower housing;

step 2: forming a hammer and anvil, respectively, within the upper chamber with the hammer being formed on the interior face of the confronting closure member and the anvil being formed on the lost motion coupling underlying the releasible latch means;

step 3: forming an axial passageway extending from the upper closure member of the upper housing and through the shaft, biasing means , releasible latch means, anvil,hammer, lost motion coupling, and into a chamber formed within the lower housing;

step 4. placing a hammer on a closure member for closing the lower end of said upper main chamber and extending the hammer into said upper main chamber concurrently with applying the closure member to the lower end of the upper chamber;

step 7. mounting an anvil respective said main shaft for decelerating the hammer in response to release of energy from said biasing means;

step 8. forming an axial passageway through said shaft that extends through said latch means, anvil, lost motion coupling, and into the chamber of the lower housing; and extending a conductor through the passageway with the conductor having ends, one end adapted to be connected to a tool attached at the lower end of the lower housing wherein the last said end is provided with a surplus length to provide for the length of the stroke occasioned by the reciprocation of the upper housing respective the lower housing.

Claim 21. The method of claim 20 and further including the step of protecting the conductor by the provision of a protective tubing through which the conductor extends, wherein the tubing is slidably received within the passageway with one end of the tubing being affixed to the upper housing closure member and the other end of the tubing opening into the chamber of the lower housing.

Claim 22. The method of claim 20 and further including the step of protecting the conductor by the provision of a protective tubing through which the conductor extends; a piston slidably received within the chamber dividing the chamber into first and second chambers, said protective tubing extends through said first chamber, said piston; and into said second chamber where the conductor emerges from the tubing and is provided with a greater length than the length of the stroke of the lost motion coupling.

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